APPENDIX B BACKGROUND COMPARISON FOR METALS

Inorganic chemicals were selected as COPCs for the Del Amo site risk assessment if they met two screening criteria: (1) the site-wide data distribution was identified as above background, and (2) the parcel-specific maximum concentration was above the non-ambient concentration breakpoint and a toxicity threshold. This appendix describes the background comparison used to identify the inorganic chemicals elevated above background concentrations for the site.

Two general approaches for background comparison are to compare the site data to data reflecting either (1) local conditions (i.e., on or near the site) or (2) regional conditions (e.g., Southern California). For metals CalEPA prefers that a local data set be used in the comparison and provides an approach for selecting a local ("ambient") data set and comparing it to site conditions. The analysis presented here uses a weight of evidence approach following the recommendations for evaluating distribution shape provided in the CalEPA methodology. As additional information, we also include a comparison of the site metals concentrations to the metals data from a well-known study on background metals concentrations in Southern California (CalEPA, 1996b).

Table B-1 presents the results of the background comparison for metals with respect to four criteria: (1) the results of the Shapiro-Wilk test for normality and lognormality, (2) the evaluation of the Quantile-Quantile plots ("Q-Q plots") which indicate the linear continuity of the fit of the distribution to either a normal or lognormal, (3) the coefficient of variation (CV) and range of values (given as the order of magnitude between the minimum and maximum values), and (4) the results of a non-parametric comparison to the regional background data set (the Wilcoxon Sign test).

The first 3 criteria are evaluated as discussed in CalEPA (1997). CalEPA (1997) states that ambient metals concentrations tend to follow a normal or lognormal distribution, with common metals such as aluminum, iron, calcium, and magnesium tending to be normally distributed, while trace metals tend to be lognormally distributed. Although the first three criteria provide related information about distribution shape, each focuses on different aspects of the distribution fit, and consideration of all these criteria (not just one) is recommended by CalEPA when evaluating whether non-ambient data are present or not. The fourth criterion does not reflect an assumption about distribution shape, but rather compares the site data set to regional background levels. Because of the unique and not necessarily consistent information provided by these four criteria, we considered all four criteria, using a weight of evidence approach to identify metals as above background for the purposes of COPC selection. A metal was identified as above background if two or more of the criteria indicated potentially non-ambient data within the expanded data set.

Each of the four criteria were evaluated as providing or not providing evidence for multiple populations (e.g., ambient vs. non-ambient) as follows. According to CalEPA, distributions

 $B\text{-}1 \\ \hspace{3.5cm} \text{BRA_AppendixB.doc}$

that contain multiple populations will generally fail the Shapiro-Wilk goodness of fit test for both normality and lognormality. Therefore, in this analysis, Shapiro-Wilk P values greater than 0.05 were considered to indicate good fits, P values between 0.03 and 0.05 were considered to indicate borderline fits, and P values lower than 0.03, were considered to provide evidence for the presence of multiple populations or concentrations that were above ambient conditions on the site. Data sets with low CVs were often fit well by both the normal and lognormal distributions. In these cases, the distribution with the highest P value was identified in Table B-1.

The second criterion was based on a graphical assessment of the distribution fit using Quantile-Quantile (Q-Q) plots (Figures B.1 – B.20). The Q-Q plots in Figures B.1 through B.20 also identify the P value from the associated Shapiro-Wilk goodness of fit test and show the fitted distribution (either normal or lognormal) graphed on top of the data histogram to assist in the interpretation of the Q-Q plots. Q-Q plots are constructed by plotting the sorted data against the quantiles of the best-fitting normal or lognormal distribution for the data. In these plots, data points should fall approximately along the 0-1 diagonal line if the distribution assumption is accurate (small deviations are to be expected and are not significant). Significant breaks or bends in the Q-Q plots indicate departures from the assumed distribution and suggest multiple populations or outliers. If the Q-Q plot of the data looked roughly linear, then the fit was classified as "ok" in Table B-1. Cases with apparent departures from the assumed distribution are classified in Table B-1 as either "B" (indicating one or more breaks or bends) or by identifying the number of potential outliers. The B classification was used in cases where the departures involved more than a few points, while the number of potential outliers was identified when only one to three points potentially fell outside the rest of the distribution.

The third criterion involves the comparison suggested by the CalEPA (1997) of the range and coefficient of variation of the data with the values typically displayed by ambient distributions of metals. CalEPA (1997) states that metals data drawn from just one population typically display a range of detected values of no more than 2 orders of magnitude, and a CV of no more than 1. If the range was over 2 orders of magnitude or the CV was greater than 1.0, the data were considered to be evidence suggesting multiple populations.

The fourth criterion uses the results of the Wilcoxon Two Sample test comparison of the site data to data from the regional background data set pertaining to Southern California. This analysis is also presented to provide additional information in identifying what metals are above background.

In surface soils, the Shapiro-Wilk test found a significant discrepancy with a normal and lognormal distribution fit for cadmium, chromium, manganese, nickel, vanadium and zinc. In general these discrepancies were corroborated by either or both of the Q-Q plot evaluation or

range and CV evaluation. These metals were also found to exceed regional background levels for Southern California with the exception of manganese for which background data were not available. Including manganese, these metals were identified as being present at the site at concentrations above background, and therefore remained in the COPC selection process. Although the Shapiro-Wilk test found that arsenic was fit well by a lognormal distribution, arsenic was identified as above background based on the bend apparent in the graphical evaluation and its CV of 1.3.

The remaining metals were identified as below background and screened out of the COPC selection for surface soils. The Q-Q plot for cobalt indicated a number of low precision samples that consisted of detections having the same value (possibly truncation of significant figures). The anomaly created by the horizontal spread of these points is obvious and results in an interference of the Shapiro-Wilk tests. However, based on a visual evaluation of the Q-Q plot, the fit for cobalt was classified as "ok". Because of the Q-Q plot assessment and the low range and CV, colbalt was excluded from the list of metals above background. Interference due to the low frequency of detections made the Shapiro-Wilk test also unreliable for silver and mercury in surface soils. Silver had 2 detections out of 15 samples, while mercury had 6 detections out of 15 samples. The ranges and CVs calculated from the data sets, as well as visual inspection of the Q-Q plots, implied that the underlying distributions had low skewness for silver and moderate skewness for mercury. In the case of mercury, the CV of 1.6 provided evidence for multiple distributions above ambient. However, the Wilcoxon test found no significant difference between the site and the regional background data sets for mercury and silver. Therefore, these metals were concluded to be within background and excluded from the COPC selection process.

The Wilcoxon test is robust to different distribution assumptions, and therefore it can provide approximate results even for cases where the distribution type is unknown. Therefore, the Wilcoxon Two Sample test was performed for silver and mercury. The Wilcoxon test indicated that both silver and mercury could not be distinguished from the background data set. The P values of the Wilcoxon test for these two metals are considered approximate due to their high frequency of non-detected values. However, because the detection limits of these data sets are relatively low, and very close to the detection limits of the associated background data set, the overall outcome of significance or non-significance is considered robust and reliable.

Results for shallow soils were similar but not identical to those for surface soils. Cadmium, chromium, copper, nickel, manganese, vanadium, and zinc were again identified above background due to their lack of fit to the two distribution types (i.e., Shapiro-Wilk P value < 0.03 and breaks or outliers in the Q-Q plot). Cadmium and vanadium also had data distributions which were significantly above the regional background level, while chromium, copper, manganese, nickel, and zinc had distributions for shallow soil that did not exceed

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background even though their concentrations in surface soil alone did exceed background. Thallium was detected in 2 out of the 22 subsurface samples; however, these detected concentrations (11 mg/kg and 12 mg/kg) were well above the mean regional background concentration. Therefore, thallium was identified as above background for shallow soils on the site.

The remaining metals were well fit by normal or lognormal distributions, were not significantly above the regional background data set, and were therefore excluded from the list of metals above background. In the case of arsenic, the shallow soil data included many more low concentrations than the surface data. These low concentrations had the effect of linearizing the Q-Q plot. Therefore, arsenic was excluded from the list of metals above background for the shallow soil layer. In the case of silver and mercury, the P values of Wilcoxon test are again considered approximate due to the high frequency of non-detected values. However, because the detection limits of these data sets are relatively low, and very close to the detection limits of the associated background data set, the overall outcome of significance or non-significance is again considered robust and reliable.

In addition, the background analysis was used to establish concentrations that individual samples could be compared to in the EAPC selection process. Ambient versus non-ambient breakpoints were identified by evaluating the Q-Q plots in Figures B.1 through B.20 for the nine metals that were determined to have concentrations above background (See Section 3.4.1.1), with the exception of thallium for which there were only 2 detects. For thallium, the breakpoint was defined to be the mean of the regional background data. For the remaining metals, Q-Q plots were used to identify the breakpoint above which a second (non-ambient) population was indicated.

As mentioned above, Cal-EPA (1997) states that "if data are drawn from just one population, the plot will be a straight line. If multiple overlapping populations are present, the plot will produce a gentle curve instead of a straight line. Gaps or inflection points in the plot (e.g., nonlinearity) suggest multiple populations, including possible outliers." CalEPA guidance (1997) further explains that "ambient conditions are defined as the range of concentrations associated with the population nearest the origin" and that this definition may be performed by inspection. Using only the data from the population nearest the origin of the Q-Q plot, a breakpoint value was selected which represents the upper range of the distribution.

The breakpoints are as follows: arsenic (10 mg/kg), cadmium (2 mg/kg), chromium (60 mg/kg), copper (150 mg/kg), manganese (450 mg/kg), nickel (25 mg/kg), thallium (0.3 mg/kg), vanadium (65 mg/kg) and zinc (170 mg/kg). Figures 7 and 11 highlight each sample location where the concentration exceeded both the ambient/non-ambient breakpoint and the residential soil PRG.

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TABLE B-1 Evidence for Sitewide COPC Status for Metals Baseline Risk Assessment Del Amo Site

Surface Soils (0-1')					Shallow Soils (0-15')				
Metal	Best Distribution (P value)	Q-Q Plot Evaluation (for Best Distribution)	Range (o.m.)/CV	Comparison to Southern California	Metal	Best Distribution (P value)	Q-Q Plot Evaluation (for Best Distribution)	Range (o.m.)/CV	Comparison to Southern California
Ag	(1)	(1)	0.8/0.9	n.s. (0.16) (2)	Ag	(1)	(1)	0.8/0.9	n.s. (0.09) (2)
Al	N(0.58)	ok	0.3/0.2	NA	Al	N(0.24)	ok	0.4/0.2	NA
As	L(0.16)	В	1.3/1.1	n.s. (0.7)	As	BL(0.04)	ok	1.7/1.4	n.s. (0.99)
Ba	L(0.29)	ok	0.2/0.2	n.s. (0.43)	Ba	N(0.23)	ok	0.4/0.2	n.s. (0.4)
Be	L(0.16)	1 outlier	0.3/0.2	n.s. (0.14)	Be	L(0.41)	ok	0.8/0.3	NA
Ca	L(0.68)	ok	0.7/0.5	NA	Ca	L(0.12)	0	0.7/0.5	NA
Cd	none	В	0.2/0.1	greater (0.00)	Cd	none	В	1.5/0.5	greater (0.00)
Co	none ⁽³⁾	ok	0.1/0.1	NA	Co	BL(0.05)	ok	0.3/0.1	n.s. (0.19)
Cr	none	1 outlier	1.2/1.6	greater (0.03)	Cr	none	1 outlier	1.4/1.5	n.s. (0.14)
Cu	L(0.17)	В	1.1/0.9	greater (0.00)	Cu	none	В	1.2/1.1	n.s. (0.06)
Fe	BL(0.04) ⁽³⁾	ok	0.1/0.1	NA	Fe	L(0.38)	ok	0.4/0.2	NA
Hg	(1)	(1)	1.4/1.6	n.s.(0.95) (2)	Hg	(1)	(1)	1.4/1.6	n.s. (0.99) (2)
K	L(0.84)	ok	0.3/0.2	NA	K	L(0.78)	ok	0.5/0.3	NA
Mg	L(0.94)	ok	0.3/0.2	NA	Mg	L(0.08)	ok	0.4/0.3	NA
Mn	none	В	0.3/0.2	NA	Mn	none	В	0.4/0.3	NA
Na	L(0.82)	ok	0.6/0.3	NA	Na	L(0.52)	ok	1.2/0.8	NA
Ni	none	В	0.7/0.6	greater (0.01)	Ni	none	В	0.8/0.5	greater (0.02)
Pb	L(0.5)	ok	1.6/1.3	n.s.(0.66)	Pb	L(0.14)	ok	2.1/1.6	n.s. (0.99)
T1	(4)	(4)	(4)	(4)	Tl	(1)	(1)	0.6/0.6	greater (judgment)
V	none	2 outliers	0.7/0.7	greater (0.03)	V	none	2 outliers	0.4/0.3	greater (0.04)
Zn	none	1 outlier	1.1/1.1	greater (0.03)	Zn	none	1 outlier	1.2/1.1	n.s. (0.73)

Identified as above background and a potential parcel-specific COPC.

Evidence for concentrations above background.

- (1) Low frequency of detections precluded test.
- (2) Low frequency of detections makes test approximate.
- (3) Low precision samples make test approximate.
- (4) No detections in surface soil.

Best Distribution

- N: Normal (P value > 0.05).
- BN: Borderline normal (P value = 0.03 to 0.05).
 - L: Lognormal (P value > 0.05).
- BL: Borderline lognormal (P value = 0.03 to 0.05).

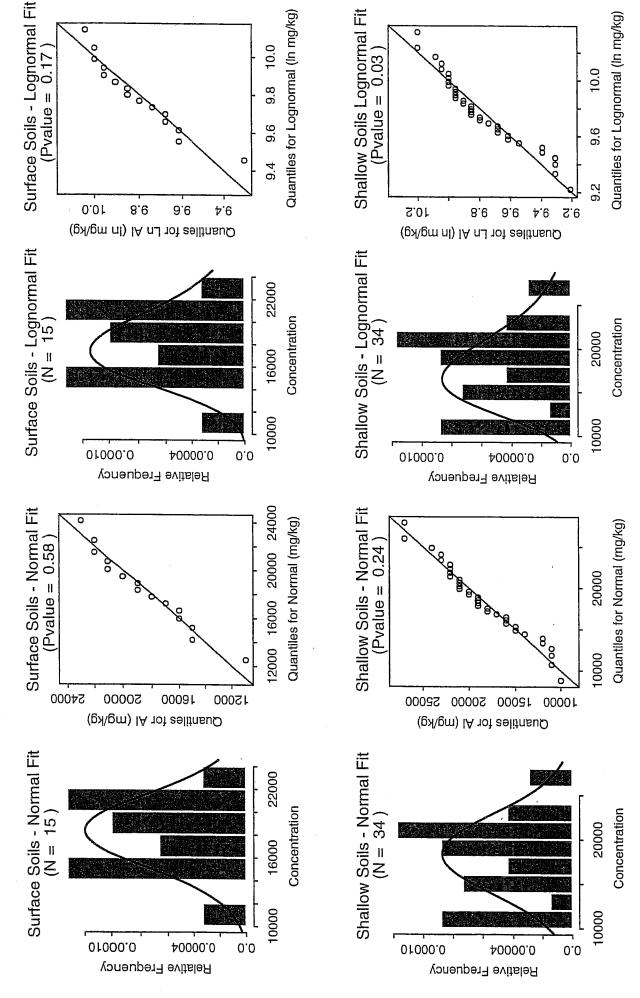
Q-Q Plot Evaluation (Figures B.1 - B.20):

- ok: Good fit, no or minor departures from linearity.
- B: Breaks in linearity or curved pattern.
- 1 outlier: Number of outliers apparent in otherwise linear graph.
 - NA: Background data set not available.

Comparison to So. California

- greater: Site data are significantly greater than background (P value $<=\ 0.05).$
 - n.s.: Site data are not significantly greater than Background (P value > 0.05).
- (0.8): P value from the Wilcoxin Two Sample Test.
- (judgment): Result concluded based on judgment.

Figure B.1 Shapiro-Wilk Distribution Tests for Aluminum Baseline Risk Assessment Del Amo Site



Surface Soils - Lognormal Fit (Pvalue = 0.16) Shallow Soils Lognormal Fit (Pvalue = 0.04) Quantiles for Lognormal (In mg/kg) Quantiles for Lognormal (In mg/kg) 10 mg/kg 3.0 Pvalue = 2.0 0. 0.4 ο.ε 0.2 0.1 ε 7 Quantiles for Ln As (in mg/kg) Quantiles for Ln As (In mg/kg) Surface Soils - Lognormal Fit (N = 15)Shallow Soils - Lognormal Fit (N = 37)50 50 40 40 Concentration Concentration 30 30 20 20 Baseline Risk Assessment 10 0 Del Amo Site 80.0 90.0 40.0 20.0 0.0 91.0 01.0 90.0 0.0 Relative Frequency Relative Frequency Shallow Soils - Normal Fit Surface Soils - Normal Fit 50 50 Quantiles for Normal (mg/kg) Quantiles for Normal (mg/kg) 40 40 (Pvalue = 0)(Pvalue = 0)30 30 20 20 10 10 0 -10 10 o 30 09 0₽ 0 L-50 01 0 09 0⊅ 30 50 10 0 0 L-Quantiles for As (mg/kg) Quantiles for As (mg/kg) Surface Soils - Normal Fit (N = 15)Shallow Soils - Normal Fit 50 50 40 Concentration Concentration (N = 37)30 20 20 9 9 20.0 90.0 ₽0.0 0.0 80.0 90.0 ₽0.0 \$0.0 0.0 Relative Frequency Relative Frequency

4.0

Figure B.2 Shapiro-Wilk Distribution Tests for Arsenic

Figure B.3
Shapiro-Wilk Distribution Tests for Barium
Baseline Risk Assessment
Del Amo Site

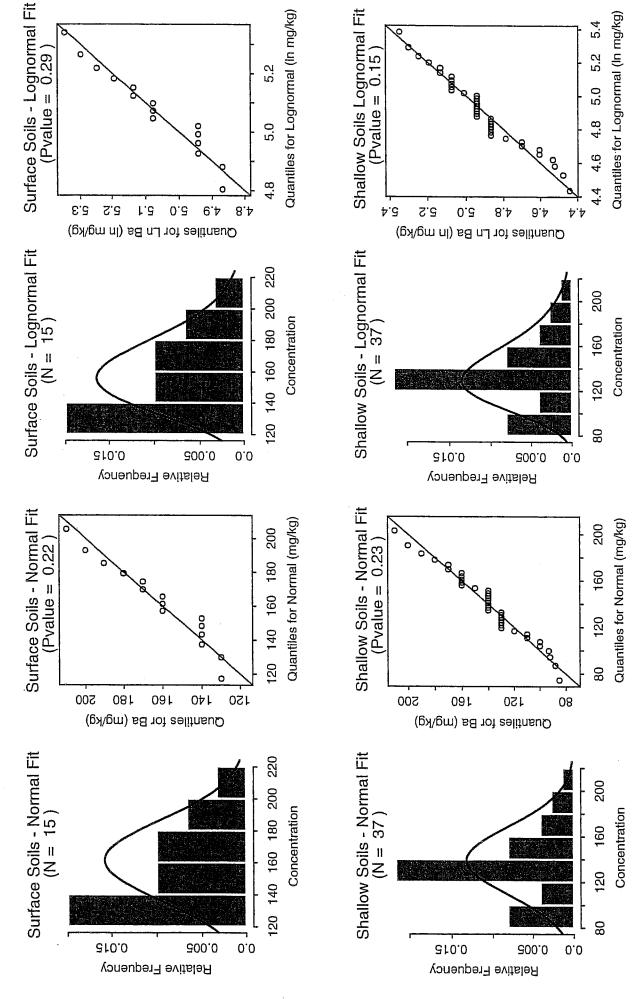


Figure B.4 Shapiro-Wilk Distribution Tests for Beryllium Baseline Risk Assessment Del Amo Site

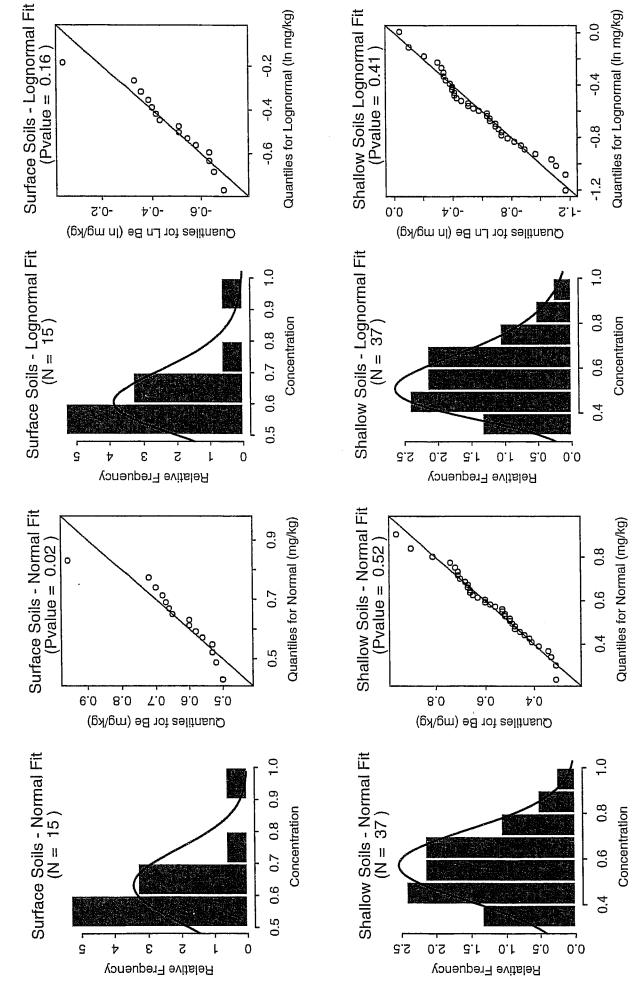
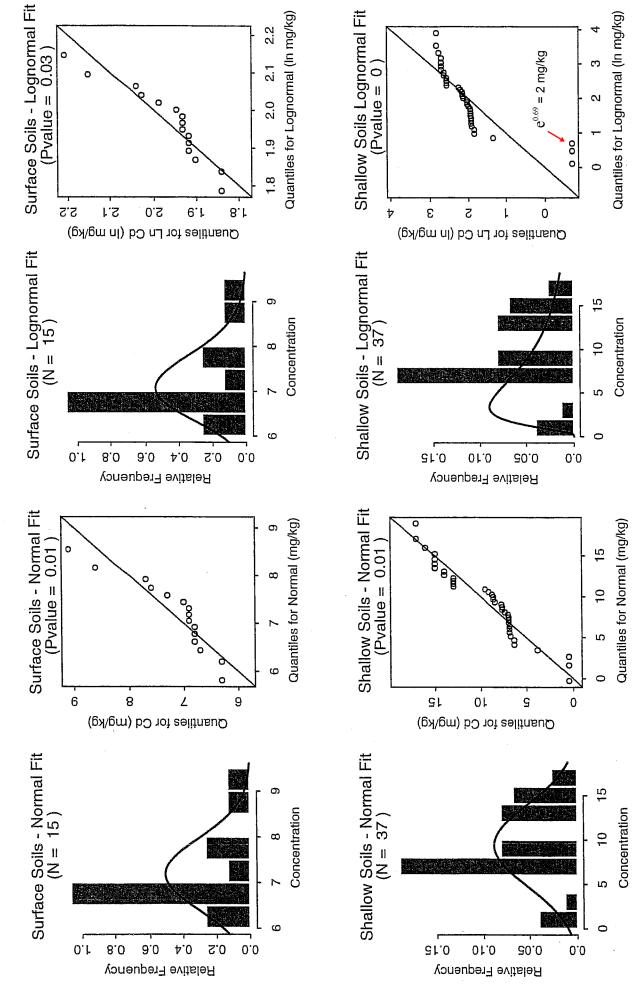


Figure B.5 Shapiro-Wilk Distribution Tests for Cadmium Baseline Risk Assessment Del Amo Site



Surface Soils - Lognormal Fit (Pvalue = 0.68) Shallow Soils Lognormal Fit Quantiles for Lognormal (In mg/kg) Quantiles for Lognormal (In mg/kg) 10.0 10.0 9.5 9.5 (Pvalue = 9.0 9.0 8.5 8.5 8.0 0.01 9:6 0.6 **2.8** 0.01 6.6 0.8 0.6 3.8 Quantiles for Ln Ca (In mg/kg) Quantiles for Ln Ca (In mg/kg) Surface Soils - Lognormal Fit (N = 15)Shallow Soils - Lognormal Fit (N = 34)25000 25000 Concentration Concentration 15000 15000 5000 5000 20000.0 0.0 01000.0 0.0 40000.0 Relative Frequency Relative Frequency Shallow Soils - Normal Fit Surface Soils - Normal Fit Quantiles for Normal (mg/kg) Quantiles for Normal (mg/kg) (Pvalue = 0.02)0 0 15000 15000 Pvalue = 5000 5000 0 12000 2000 12000 0009 0 Quantiles for Ca (mg/kg) Quantiles for Ca (mg/kg) 25000 Surface Soils - Normal Fit (N = 15)25000 Shallow Soils - Normal Fit (N = 34) Concentration Concentration 15000 15000 5000 5000 31000.0 20000.0 0.0 80000.0 ₽0000.0 0.0 Relative Frequency Relative Frequency

Figure B.6 Shapiro-Wilk Distribution Tests for Calcium Baseline Risk Assessment Del Amo Site

Surface Soils - Lognormal Fit (Pvalue = 0) Quantiles for Lognormal (In mg/kg) Shallow Soils Lognormal Fit Quantiles for Lognormal (In mg/kg) 60 mg/kg 60 mg/kg 0 0 Pvalue = o 9 Þ 9 Þ ε Quantiles for Ln Cr (In mg/kg) Quantiles for Ln Cr (In mg/kg) Surface Soils - Lognormal Fit (N = 15)Shallow Soils - Lognormal Fit (N = 37)250 250 Concentration Concentration 150 150 50 20 0.0 0.020 010.0 £0.0 20.0 10.0 0.0 Relative Frequency Relative Frequency 300 300 Surface Soils - Normal Fit Shallow Soils - Normal Fit Quantiles for Normal (mg/kg) Quantiles for Normal (mg/kg) 200 200 Pvalue = 00 0 Pvalue = o coageooo 100 100 300 200 100 0 300 500 100 0 Quantiles for Cr (mg/kg) Quantiles for Cr (mg/kg) Surface Soils - Normal Fit (N = 15)Shallow Soils - Normal Fit (N = 37)250 250 Concentration Concentration 150 150 50 310.0 010.0 900.0 0.0 310.0 200.0 010.0 0.0 Relative Frequency Relative Frequency

Figure B.7 Shapiro-Wilk Distribution Tests for Chromium Baseline Risk Assessment Del Amo Site

Surface Soils - Lognormal Fit (Pvalue = 0.01) Shallow Soils Lognormal Fit (Pvalue = 0.05) Quantiles for Lognormal (In mg/kg) Quantiles for Lognormal (In mg/kg) 000000000 2.40 2.5 2.30 2.3 2.20 2.1 2,50 2,40 2.30 2.20 7.2 2.5 2.1 2,3 Quantiles for Ln Co (In mg/kg) Quantiles for Ln Co (In mg/kg) Surface Soils - Lognormal Fit Shallow Soils - Lognormal Fit (N = 37)덛 Shapiro-Wilk Distribution Tests for Cobalt Concentration Concentration (N = 15)우 Baseline Risk Assessment 9 Del Amo Site ω Figure B.8 9.0 4.0 2.0 0.0 4.0 ε.0 2.0 0.0 1.0 Relative Frequency Relative Frequency Shallow Soils - Normal Fit (Pvalue = 0.03) Surface Soils - Normal Fit 12.0 Quantiles for Normal (mg/kg) Quantiles for Normal (mg/kg) 7 0 0 0 0 0 0 0 0 Pvalue = 0.0111.0 건 Pvalue = 10.0 10 9.0 15.0 0.11 10.0 0.6 15 10 8 カレ Quantiles for Co (mg/kg) Quantiles for Co (mg/kg) Surface Soils - Normal Fit (N = 15)Shallow Soils - Normal Fit 7 Concentration Concentration 7 10 9 b ∞ ω 9.0 4.0 2.0 0.0 ۵,4 €.0 2.0 1.0 0.0

Relative Frequency

2.50

2.7

Relative Frequency

Surface Soils - Lognormal Fit (Pvalue = 0.17) Quantiles for Lognormal (In mg/kg) Shallow Soils Lognormal Fit Quantiles for Lognormal (In mg/kg) 0 $e^{5.01} = 150 \text{ mg/kg}$ (Pyalue = က 3.0 0.3 6.4 3.5 3.0 0.4 9 Quantiles for Ln Cu (In mg/kg) Quantiles for Ln Cu (In mg/kg) Surface Soils - Lognormal Fit (N = 15)Shallow Soils - Lognormal Fit (N = 37)200 250 250 200 Concentration Concentration 100 150 100 150 20 50 210.0 800.0 400.0 0.0 310.0 200.0 0.0 Relative Frequency Relative Frequency 250 Shallow Soils - Normal Fit Surface Soils - Normal Fit Quantiles for Normal (mg/kg) Quantiles for Normal (mg/kg) 200 ٥ (Pvalue = 0)Pvalue = 00 150 0 50 100 50 0 8 -20 -50 0 500 200 120 100 09 0 09-520 09-100 09 0 Quantiles for Cu (mg/kg) Quantiles for Cu (mg/kg) Surface Soils - Normal Fit (N = 15)Shallow Soils - Normal Fit (N = 37)100 150 200 250 250 100 150 200 Concentration Concentration 20 20 800.0 400.0 0.0 210.0 010.0 200.0 0.0 Relative Frequency Relative Frequency

Figure B.9 Shapiro-Wilk Distribution Tests for Copper Baseline Risk Assessment Del Amo Site

Surface Soils - Lognormal Fit (Pvalue = 0.04) Shallow Soils Lognormal Fit (Pvalue = 0.38) Quantiles for Lognormal (In mg/kg) Quantiles for Lognormal (In mg/kg) 10.4 10.6 10.3 10.2 10.2 10.1 9.8 10.0 4.01 £.01 2.0 r 1.01 0.01 4.01 8.6 0.01 Quantiles for Ln Fe (In mg/kg) Quantiles for Ln Fe (In mg/kg) Surface Soils - Lognormal Fit (N = 15)Shallow Soils - Lognormal Fit (N = 34)45000 30000 35000 Concentration Concentration | | | | 26000 25000 22000 15000 01000.0 ₽0000.0 0.0 80000.0 40000.0 0.0 Relative Frequency Relative Frequency Shallow Soils - Normal Fit (Pvalue = 0.21) Surface Soils - Normal Fit Quantiles for Normal (mg/kg) Quantiles for Normal (mg/kg) 30000 Pvalue = 0.04 35000 25000 26000 15000 22000 30000 26000 22000 32000 **S2000** 12000 Quantiles for Fe (mg/kg) Quantiles for Fe (mg/kg) 45000 Surface Soils - Normal Fit Shallow Soils - Normal Fit (N = 34)30000 35000 Concentration Concentration (N = 15)26000 25000 15000 22000 01000.0 0.0 80000.0 **⊅**0000.0 40000.0 0.0 Relative Frequency Relative Frequency

Figure B.10
Shapiro-Wilk Distribution Tests for Iron
Baseline Risk Assessment
Del Amo Site

Surface Soils - Lognormal Fit (Pvalue = 0.5) Shallow Soils Lognormal Fit (Pvalue = 0.14) Quantiles for Lognormal (In mg/kg) Quantiles for Lognormal (In mg/kg) Pvalue = 9 Þ ε 7 9 ε 2 Quantiles for Ln Pb (In mg/kg) Quantiles for Ln Pb (In mg/kg) Surface Soils - Lognormal Fit (N = 15)Shallow Soils - Lognormal Fit (N = 37)100 150 200 250 250 100 150 200 Concentration Concentration 20 20 0.020 0.010 0.0 ₽0.0 60.0 20.0 10.0 0.0 Relative Frequency Relative Frequency 250 250 Surface Soils - Normal Fit Shallow Soils - Normal Fit Quantiles for Normal (mg/kg) Quantiles for Normal (mg/kg) (Pvalue = 0)0 0 150 150 (Pvalue = 00000000 50 50 -20 20 200 100 09 0 09-200 100 9 0 09-Quantiles for Pb (mg/kg) Quantiles for Pb (mg/kg) Surface Soils - Normal Fit (N = 15)Shallow Soils - Normal Fit (N = 37)250 50 100 150 200 250 100 150 200 Concentration Concentration 50 310.0 010.0 200.0 0.0 310.0 900.0 010.0 0.0 Relative Frequency Relative Frequency

Figure B.11 Shapiro-Wilk Distribution Tests for Lead

Baseline Risk Assessment

Del Amo Site

Surface Soils - Lognormal Fit Shallow Soils Lognormal Fit (Pvalue = 0.08) Quantiles for Lognormal (In mg/kg) Quantiles for Lognormal (In mg/kg) 9.2 Pvalue = $\tilde{0}.94$ 8 9.2 9.0 Pvalue = 8.8 8.8 8.6 5.6 0.6 8.8 8.6 5.6 4.6 4.8 0.6 8.8 9.8 Quantiles for Ln Mg (In mg/kg) Quantiles for Ln Mg (In mg/kg) Surface Soils - Lognormal Fit (N = 15)Shallow Soils - Lognormal Fit (N = 34)12000 12000 Concentration Concentration 0008 0009 6000 8000 4000 0.00025 01000.0 0.0 0.00020 01000.0 0.0 Relative Frequency Relative Frequency 11000 Surface Soils - Normal Fit Shallow Soils - Normal Fit Quantiles for Normal (mg/kg) 12000 Quantiles for Normal (mg/kg) 0 0.4 8 0006 Pvalue = Pvalue = 8000 7000 5000 4000 11000 0006 0009 0007 15000 0008 0007 Quantiles for Mg (mg/kg) Quantiles for Mg (mg/kg) 12000 Surface Soils - Normal Fit (N = 15)Shallow Soils - Normal Fit (N = 34)12000 Concentration Concentration 4000 6000 8000 6000 8000 0.00025 01000.0 0.0 0.00020 01000.0 0.0 Relative Frequency Relative Frequency

Figure B.12 Shapiro-Wilk Distribution Tests for Magnesium Baseline Risk Assessment Del Amo Site

Surface Soils - Lognormal Fit (Pvalue = 0.02) Shallow Soils Lognormal Fit (Pvalue = 0.01) Quantiles for Lognormal (In mg/kg) Quantiles for Lognormal (In mg/kg) Ó 450 mg/kg 6.4 450 mg/kg 00°00° 6.2 6.0 6.0 5.8 5.6 þ.8 2.9 0.8 8.3 9.9 4.8 2.9 0.8 8.3 9.3 Quantiles for Ln Mn (In mg/kg) Quantiles for Ln Mn (In mg/kg) Surface Soils - Lognormal Fit Shallow Soils - Lognormal Fit (N = 34)700 009 009 Concentration Concentration (N = 15)200 500 400 Baseline Risk Assessment 400 300 300 Del Amo Site 400.0 200.0 0.0 900.0 0.0 ₽00.0 200.0 Relative Frequency Relative Frequency Surface Soils - Normal Fit Shallow Soils - Normal Fit Quantiles for Normal (mg/kg) Quantiles for Normal (mg/kg) 900 Pvalue = 0.03Pvalue = 0200 2000 500 400 400 300 300 200 009 009 00b 300 500 009 200 007 300 Quantiles for Mn (mg/kg) Quantiles for Mn (mg/kg) Surface Soils - Normal Fit (N = 15)Shallow Soils - Normal Fit 700 009 9 Concentration Concentration (N = 34)200 500 400 400 300 300 **₽**00.0 200.0 0.0 900.0 400.0 200.0 0.0 Relative Frequency Relative Frequency

Shapiro-Wilk Distribution Tests for Manganese

Figure B.13

Surface Soils - Lognormal Fit (Pvalue = 0) Shallow Soils Lognormal Fit Quantiles for Lognormal (In mg/kg) Quantiles for Lognormal (In mg/kg) 0 Pvalue = Ņ 000000000 ကု ကု 0 0000 0 દ--5 0 Ļ-7-Quantiles for Ln Hg (In mg/kg) Quantiles for Ln Hg (In mg/kg) Surface Soils - Lognormal Fit (N = 15)Shallow Soils - Lognormal Fit (N = 37)1.2 Concentration Concentration 0.8 0.8 0.4 0.4 0.0 0.0 0 9 9 Þ ε 7 8 9 7 0 Þ Relative Frequency Relative Frequency Shallow Soils - Normal Fit Surface Soils - Normal Fit Quantiles for Normal (mg/kg) Quantiles for Normal (mg/kg) 1.0 0. Pvalue = 0Pvalue = 0 000 000000 0 0.5 0.5 0.0 0.0 0 000 o 0.0 0.1 6.0 0.0 ٥.٢ **G**.0 Quantiles for Hg (mg/kg) Quantiles for Hg (mg/kg) Surface Soils - Normal Fit (N = 15)Shallow Soils - Normal Fit (N = 37)1.2 1.2 Concentration Concentration 0.8 0.8 0.4 0.4 0.0 0.0 ε 7 0 ε 5 Þ 0 Relative Frequency Relative Frequency

Figure B.14
Shapiro-Wilk Distribution Tests for Mercury
Baseline Risk Assessment
Del Amo Site

Surface Soils - Lognormal Fit Shallow Soils Lognormal Fit (Pvalue = 0) Quantiles for Lognormal (In mg/kg) Quantiles for Lognormal (In mg/kg) 4.0 4.0 25 mg/kg 25 mg/kg (Pvalue = 03.5 3.5 0 3.0 3.0 2.5 2.5 õ 2.0 4.0 3.5 3.0 2.5 0.2 3.5 0.4 3.0 2.5 Quantiles for Ln Ni (In mg/kg) Quantiles for Ln Ni (In mg/kg) Surface Soils - Lognormal Fit (N = 15)Shallow Soils - Lognormal Fit (N = 37)9 9 20 20 Concentration Concentration 40 40 30 30 20 20 10 9 90.0 40.0 0.0 20.0 90.0 40.0 S0.0 0.0 Relative Frequency Relative Frequency Shallow Soils - Normal Fit Surface Soils - Normal Fit 9 9 Quantiles for Normal (mg/kg) Quantiles for Normal (mg/kg) 20 20 (Pvalue = 0)40 40 (Pvalue = 0 30 30 20 20 9 9 0 o 09 09 10 0t 30 50 09 9 07 10 30 50 0 Quantiles for Ni (mg/kg) Quantiles for Ni (mg/kg) Surface Soils - Normal Fit (N = 15)Shallow Soils - Normal Fit 9 9 50 50 Concentration Concentration 40 (N = 37)40 30 30 20 20 10 10 90.0 ₽0.0 20.0 0.0 90.0 **⊅**0.0 20.0 0.0 Relative Frequency Relative Frequency

Figure B.15 Shapiro-Wilk Distribution Tests for Nickel Baseline Risk Assessment Del Amo Site

Surface Soils - Lognormal Fit (Pvalue = 0.84) Shallow Soils Lognormal Fit (Pvalue = 0.78) Quantiles for Lognormal (In mg/kg) Quantiles for Lognormal (In mg/kg) 8.4 8.6 8.2 8.2 8.0 7.8 4.8 2.8 0.8 9.8 4.8 2.8 0.8 Quantiles for Ln K (In mg/kg) Quantiles for Ln K (In mg/kg) Surface Soils - Lognormal Fit Shallow Soils - Lognormal Fit (N = 34)4500 0009 Concentration Concentration (N = 15)3500 4000 2500 2000 Del Amo Site 8000.0 4000.0 0.0 ₽000.0 2000.0 0.0 Relative Frequency Relative Frequency Surface Soils - Normal Fit Shallow Soils - Normal Fit Quantiles for Normal (mg/kg) Quantiles for Normal (mg/kg) 4500 0009 o 0.03 Pvalue = 0.31 Pvalue = 3500 4000 2000 2500 4200 3200 S200 0009 4000 2000 Quantiles for K (mg/kg) Quantiles for K (mg/kg) Surface Soils - Normal Fit (N = 15)Shallow Soils - Normal Fit 4500 0009 Concentration Concentration (N = 34)3500 4000 2500 2000 8000.0 4000.0 £000.0 0.0 1000.0 0.0 Relative Frequency Relative Frequency

Shapiro-Wilk Distribution Tests for Potassium

Figure B.16

Baseline Risk Assessment

Surface Soils - Lognormal Fit (Pvalue = 0) Shallow Soils Lognormal Fit Quantiles for Lognormal (In mg/kg) Quantiles for Lognormal (In mg/kg) -1.0 - 8 0 Pvalue = 0 000000000000 -2·0 -2.0 800 -3.0 -3.0 0. r-0.2-0.ε-0.1-0.2-0.6-Quantiles for Ln Ag (In mg/kg) Quantiles for Ln Ag (In mg/kg) Surface Soils - Lognormal Fit (N = 15)Shallow Soils - Lognormal Fit (N = 37)0.7 0.7 0.5 Concentration 0.5 Concentration Baseline Risk Assessment 0.3 0.3 0.1 0.1 Del Amo Site 8 9 Þ 7 0 8 9 7 0 Þ Relative Frequency Relative Frequency Shallow Soils - Normal Fit Surface Soils - Normal Fit 9.0 9.0 Quantiles for Normal (mg/kg) Quantiles for Normal (mg/kg) Pvalue = 00.4 0 8 (Pvalue = 0.2 0.2 0.0 0.0 000 0 2.0 9.0 ₽.0 0.0 9.0 4.0 2.0 0.0 Quantiles for Ag (mg/kg) Quantiles for Ag (mg/kg) Surface Soils - Normal Fit (N = 15)Shallow Soils - Normal Fit (N = 37)0.7 0.7 Concentration 0.5 Concentration 0.5 0.3 0.1 0.1 8 9 2 0 0 Þ 8 9 Þ 5 Relative Frequency Relative Frequency

Figure B.17 Shapiro-Wilk Distribution Tests for Silver

Surface Soils - Lognormal Fit (Pvalue = 0.82) Shallow Soils Lognormal Fit (Pvalue = 0.11) Quantiles for Lognormal (In mg/kg) 6.4 Pvalue = 6.0 5.6 8.8 4.9 9.3 0.8 **6.**7 **3**.9 Quantiles for Ln Na (In mg/kg) Quantiles for Ln Na (In mg/kg) Surface Soils - Lognormal Fit (N = 15)Shallow Soils - Lognormal Fit (N = 34)1000 Shapiro-Wilk Distribution Tests for Sodium 800 Concentration 900 Baseline Risk Assessment 400 200 Del Amo Site Figure B.18 0.0020 0100.0 0.0 8000.0 ₽000.0 Relative Frequency Relative Frequency 1000 Surface Soils - Normal Fit Shallow Soils - Normal Fit Quantiles for Normal (mg/kg) 0 Pvalue = 0.63800 Pvalue = 0009 400 200 1000 008 200 009 00₺ 3000 1000 0 Quantiles for Na (mg/kg) Quantiles for Na (mg/kg) Surface Soils - Normal Fit (N = 15)1000 Shallow Soils - Normal Fit (N = 34)800 Concentration 009 400 200 0.0020 0100.0 0.0 8000.0 ₽000.0

Relative Frequency

6.8

Quantiles for Lognormal (In mg/kg)

6.5

5.5

3000

1000

0.0

Concentration

Quantiles for Normal (mg/kg)

3000

1000

3000

1000

0.0

Relative Frequency

Concentration

Surface Soils - Lognormal Fit Shallow Soils Lognormal Fit Quantiles for Lognormal (In mg/kg) Quantiles for Lognormal (In mg/kg) 5.0 5.0 65 mg/kg 65 mg/kg (Pvalue = 0)o (Pvalue = 0)4.5 4.5 0 00000 4.0 4.0 3.5 3.5 3.0 0 0.3 9. Þ 4.0 3.5 0.8 **3.**4 9.ε 0.4 3.5 Quantiles for Ln V (In mg/kg) Quantiles for Ln V (in mg/kg) Surface Soils - Lognormal Fit (N = 15)Shallow Soils - Lognormal Fit (N = 37)140 140 Concentration Concentration 100 9 Baseline Risk Assessment 9 9 20 20 Del Amo Site 0.0 0.0 0.020 010.0 0.020 010.0 Relative Frequency Relative Frequency Shallow Soils - Normal Fit Surface Soils - Normal Fit 150 Quantiles for Normal (mg/kg) 150 Quantiles for Normal (mg/kg) (Pvalue = 0)Pvalue = 0 Ö 100 100 o 0 00000000000000 0 50 50 120 001 09 120 100 9 0 Quantiles for V (mg/kg) Quantiles for V (mg/kg) Shallow Soils - Normal Fit (N = 37)Surface Soils - Normal Fit (N = 15)140 Concentration Concentration 9 100 9 9 20 20 0.020 0.0 010.0 0.020 0.0 010.0 Relative Frequency Relative Frequency

Shapiro-Wilk Distribution Tests for Vandadium

Figure B.19

Surface Soils - Lognormal Fit (Pvalue = 0.02) Shallow Soils Lognormal Fit Quantiles for Lognormal (In mg/kg) Quantiles for Lognormal (In mg/kg) 6.5 170 mg/kg 9 0 (Pvalue = 0)0 5.5 4.5 3.5 **3.9** 3.3 3.5 ε g.p 9 9 ħ Quantiles for Ln Zn (In mg/kg) Quantiles for Ln Zn (In mg/kg) Surface Soils - Lognormal Fit (N = 15)Shallow Soils - Lognormal Fit (N = 37)800 900 900 Concentration Concentration 400 400 200 200 900.0 400.0 200.0 0.0 800.0 400.0 0.0 Relative Frequency Relative Frequency Shallow Soils - Normal Fit Surface Soils - Normal Fit 900 900 Quantiles for Normal (mg/kg) Quantiles for Normal (mg/kg) 170 mg/kg Pvalue = 0Pvalue = 0400 70 mg/kg 400 200 200 800 o 009 0 009 00₺ 200 0 00₺ 500 Quantiles for Zn (mg/kg) Quantiles for Zn (mg/kg) Shallow Soils - Normal Fit (N = 37)Surface Soils - Normal Fit (N = 15)800 900 900 Concentration Concentration 400 400 200 200 £00.0 100.0 0.0 900.0 ₽00.0 200.0 0.0 Relative Frequency Relative Frequency

Figure B.20 Shapiro-Wilk Distribution Tests for Zinc Baseline Risk Assessment Del Amo Site